

# ***U.S. PATENT APPLICATION***

***Inventor(s):*** Aris MARDIROSSIAN

***Invention:*** GLOBAL PAGING SYSTEM USING PACKET-SWITCHED DIGITAL  
DATA NETWORK AND REMOTE COUNTRY DESIGNATION

***NIXON & VANDERHYE P.C.  
ATTORNEYS AT LAW  
1100 NORTH GLEBE ROAD, 8<sup>TH</sup> FLOOR  
ARLINGTON, VIRGINIA 22201-4714  
(703) 816-4000  
Facsimile (703) 816-4100***

## ***SPECIFICATION***

GLOBAL PAGING SYSTEM USING  
PACKET-SWITCHED DIGITAL  
DATA NETWORK AND REMOTE COUNTRY DESIGNATION

This invention relates to a paging system and  
5 corresponding method of use. More particularly, this  
invention relates to a global paging system utilizing a  
land-based packet-switched digital data network (e.g. the  
Internet) and a feature for permitting subscribers to  
remotely designate countries in which they are, or expect  
10 to be, located. According to certain alternative  
embodiments, the instant invention enables cellular phone  
conversations to take place country-to-country over a  
packet switched digital data network, with the callee  
being able to pre-designate which country(ies) he/she is  
15 able to receive calls in, or expects to be located.

BACKGROUND OF THE INVENTION

Paging systems and the like are old and well-known.  
For example, see U.S. Patent Nos. 5,396,643; 5,392,452;  
5,552,779; and 5,548,814, the entire disclosures of which  
20 are hereby incorporated herein by reference.

U.S. Patent No. 5,396,643 discloses a geographic-  
area selective satellite based paging system and

corresponding method. A terminator having a pager for receiving messages selects a long-term preferred geographic area and a short-term preferred geographic area. Alternatively, a paging originator may select a customized geographic-area into which to broadcast paging information. Thus, the area to which the page is broadcast is limited. When the terminator leaves his normally preferred geographic-area, he may call a gateway and provide a short-term preferred geographic-area.

Unfortunately, the paging system of the '643 patent suffers from at least the following problems: (i) the satellite communication system which is utilized is both costly and may become unreliable in certain situations; (ii) the hardware and software needed for satellite access and use is complicated, costly, and subject to breakdown; (iii) when pages to the terminator are unanswered, the originator must blindly select a customized geographic-area in which the page is attempted; (iv) only two geographic-areas, the long-term and short-term areas, may be stored and/or adjusted by the subscriber; (v) the system may be difficult to implement in many foreign countries; and (vi) satellite

communications are not cost-effective in circumstances akin to the invention described below.

U.S. Patent No. 5,493,286 discloses a system for providing communications based on geographic location.

5 Unfortunately, the system and method of the '286 patent would not be particularly useful in a global network, do not permit the subscriber to remotely select or designate countries in which he or she will most likely be, and is based on inherently limited radio frequency (RF)  
10 communications.

U.S. Patent No. 5,552,779 discloses a wide area paging system in which paging messages input in one local area can be broadcast to a receiver in another local area without necessarily broadcasting the message in all  
15 areas. Provided in the system of the '779 patent are a plurality of pagers and means for transferring paging requests from one local area to another where the intended recipient of the paging request is currently located. Associated with each local area transmitter are  
20 a subscriber storage means for storing a unique identifying address and a current location for each resident pager. Thus, a paging message for a paging

receiver normally residing in a first local area, but temporarily located in a second local area, is broadcast by the transmitting means serving the second local area. For example, in the '779 patent disclosure, the receiving user may telephone the system and thereafter be prompted by computer voice to enter the telephone number from which he is calling, including the country code, city or area code, and the local number. Entry of the phone number allows the paging system to know where to send the receiving user's messages. If there is no broadcast coverage in the area entered, the receiving user will be so informed and the messages will not be sent. Additionally, the disclosure of the '779 patent includes a "roam mode" which is utilized when the receiving user travels outside of his home or standard area.

Unfortunately, the paging system of the '779 patent is lacking for at least the following reasons: (i) other than the roaming feature, the receiving user cannot input into the system designated country locations where he or she expects to be in the future; (ii) the '779 system would be inefficient if utilized on a global basis; (iii) the '779 system does not permit the service provider to

bill users or subscribers on a country-designation, or extent of coverage, basis; (v) the system for forwarding pages is burdensome, time consuming, and inefficient; and (vi) the roam feature is undesirable and expensive.

5           It is apparent from the above that there exists a need in the art for a more efficient global paging system in which potential receiving users or subscribers may remotely input country designations in which they are to be paged, and/or may remotely input a list of countries  
10   in which they desire paging services. Furthermore, there exists a need in the art for a more cost efficient and simplistic paging system which does not utilize costly and complex satellite technology and/or transmission-suspect data networks.

15           Regarding cellular phone embodiments of this invention, it has been disclosed in publications to conduct phone-to-phone conversations over the Internet. However, this would be inefficient for cellular phone systems when the callee may be in any one of a plurality  
20   of foreign countries, his exact whereabouts not being known to the caller. In such a situation, it would be desirable to not require the callee's cellular phone to

continuously have to update the system via roaming, for example as to its location, as this is expensive and inefficient.

It is a purpose of this invention to fulfill the  
5 above-described needs in the art, as well as other needs which will become apparent to the skilled artisan from the following detailed description of this invention.

#### SUMMARY OF THE INVENTION

Generally speaking, this invention fulfills the  
10 above-described needs in the art by providing a method of paging a receiving user via a packet-switched digital data network, the method comprising the steps of:

a) an originating user E-mailing a paging  
signal to a first web site or server of a paging system,  
15 the first server located in a first country and the  
paging signal including a pager I.D. of a pager belonging to the receiving user and a paging message to be sent to the pager;

b) designating a second country in which the  
20 receiving user is to be paged;

c) the first web site or server transmitting the pager I.D. and the paging message over a land-based packet-switched digital data network to a second web site or server located in the designated second country; and

5 d) the second server in the designated second country causing a wireless transmitter located in the second country to attempt to page the pager of the receiving user.

This invention will now be described with reference  
10 to certain embodiments thereof as illustrated in the following drawings.

#### IN THE DRAWINGS

Figure 1 is a block diagram/schematic of a global paging system or network according to certain embodiments  
15 of this invention.

Figure 2 is a flowchart illustrating how subscribers to the Figure 1 system may input a list of countries in which paging service is desired and/or designate particular countries in which to be paged for a  
20 predetermined period of time.





paging data around the world so that subscribers to the system or receiving users may be paged in different countries around the world, regardless of whether the caller or originating user knows the exact whereabouts of the receiving user. The term "receiving user" (RU) is used herein to define the recipient of a page or cellular phone call. Meanwhile, the term "originating user" (OU) is used herein to describe the person or party who originates a page or cellular phone call, i.e. the one who desires to page or call the receiving user.

When the originating user contacts the paging gateway, via either the public switched telephone network (PSTN) or e-mail to attempt a page, he or she inputs the I.D. of the receiving user's pager along with a paging message. According to certain embodiments of this invention, the paging system is able to page the receiving user in a plurality of different countries around the world, regardless of whether the originating user knows or inputs the country in which the receiving user is located. According to this invention, the RU is paged in one country at a time (or in one coverage area

at a time) so that the system does not simultaneously  
page the RU all over the world.

Once the paging gateway is accessed by the  
originating user, a web site or server 9 with access to a  
5 land-based digital data network, such as the internet,  
transmits to a receiving server or web site over digital  
data network 3 a paging information signal, e.g. a  
packetized digital data signal, that includes the pager's  
I.D., the paging message, country data indicative of the  
10 country to which paging is first to be attempted, and  
data indicative of the addressable coverage area in the  
country to be paged.

Figure 1 illustrates a global paging system  
according to certain embodiments of this invention. As  
15 shown, the paging system includes land-based packet-  
switched digital data network (e.g. the Internet) 3 which  
interconnects a plurality of different addressable  
coverage areas 5-8, each of areas 5-8 being located in a  
different country around the world according to certain  
20 embodiments of this invention. It will be recognized by  
those of skill in the art however that additional  
coverage areas are also provided in the Figure 1 paging

system, with numerous coverage areas being located in a particular country in certain embodiments. For example, about 200 coverage areas may be located in the U.S. while only 15 are located in the U.K., and 4 in Mexico. Each coverage area may have its own server or web site 9 according to certain embodiments of this invention, or alternatively, each country may be provided with only one server 9 regardless of the number of coverage areas in each country.

10       The global paging system includes at least one web site or server 9 located in each illustrated coverage area in certain embodiments, at least one digital transmitter/receiver 11 located in each coverage area, at least one paging transmitter or tower 13 located in each coverage area, a communication link (e.g. PSTN or internet) 15 in each coverage area 5-8 for allowing originating users (OUs) to access the gateway in order to page a selected receiving user (RU), and at least one DTMF telephone and/or PC 17 for allowing originating users to access the gateway in order to page desired RUs. Each transmitting (or receiving) tower 13 is for sending out a paging signal 19 (via radio frequency, microwave,

etc.) to a selected pager 21 of the receiving user in an appropriate coverage area.

According to alternative embodiments of this invention, cellular phones 23 may be used instead of pagers, wherein the system shown in Figure 1 may be utilized to enable cellular telephone calls to take place around the world via network 3 regardless if the originating user knows the country in which the receiving user is located (and no roaming feature is needed). In cell phone embodiments, each tower 13 represents a cell phone tower for transmitting/receiving digital data to and/or from cell phone(s) 23.

In operation, the Figure 1 system may work as follows. An originating user utilizes his/her conventional DTMF telephone 17 and calls a local telephone number of the paging service (e.g. 1-800-444-0000) in order to access a local web site or server 9 of the paging service. Alternatively, the originating user may use his or her PC 17 to access the paging system via a modem (not shown). Alternatively, the OU, from his/her own web site on network 3, may E-mail or otherwise access the system via link 15. According to still other

embodiments, the OU may simply use his DTMF phone and dial the number (e.g. 212-xxx-yyyy) of the RU's pager and thereafter input the paging message to a server 9 when prompted.

5           After the originating user (OU) telephones or E-mails an originating web site or server 9 in his local (or distant) coverage area or country, server 9 prompts the OU to input a paging message, the I.D. of the receiving user's pager 21, and the country or coverage  
10       area where the RU is located if this is known to the OU. The OU, via DTMF for example, then inputs the paging message, the RU's pager I.D., and when possible the country or coverage area data where the RU is located. According to electronic-mail (E-mail) embodiments using  
15       network 3 as link 15, the OU may E-mail the RU's pager I.D., paging message, and/or the country where the RU is believed to be located to the local or remote web site or server 9 accessed (i.e. originating server) so that only one transmission to the web site 9 is required.

20           When the OU inputs the location of the RU (via country or coverage area data), web site or server 9 then accesses packet-switched digital data network 3 and

transmits receiving site 9 I.D. data, the pager I.D., and the paging message data over network 3 to the receiving or terminating web site or server 9 in the country or coverage area (i.e. one of 5-9) input by the OU. Once  
5 the terminating web site or server 9 in the country where the RU is located is given the pager I.D. and paging message, this terminating server transmits or causes paging message and I.D. data to be transmitted 11 to the appropriate transmitting tower 13, and instructs or  
10 causes the tower to page the RU in its coverage area and deliver the paging message.

According to certain embodiments, only one web site or server 9 is provided in each country along with a transmitter/receiver 11, while a plurality of different  
15 towers 13 are provided in each country thereby allowing the server 9 to decide which tower is located in the coverage area designated by the OU or RU. According to certain embodiments, the terminating site 9 causes all towers to simultaneously page the RU in all of the  
20 country's coverage areas.

If a transmitting tower 13 receives confirmation that the RU's pager 21 has been accessed, then the tower

sends the RU's pager 21 the paging message originally  
input to the system by the OU via RF, microwave, or the  
like. In such a manner, an OU may page an RU in any  
country around the world serviced by the Figure 1 paging  
5 system when the OU knows the whereabouts of the RU.

In accordance with E-mail embodiments, the OU never  
needs to use a phone, but simply E-mails paging data  
(e.g. pager I.D., paging message, country to page RU in,  
etc.) to an originating web site 9 in the paging system  
10 which takes care of the rest.

Let us now turn to the situation where the OU does  
not know the whereabouts of the RU. In this scenario,  
the OU accesses an originating web site or server 9 of  
the paging system via E-mail or DTMF in the same manner  
15 as set forth above, but cannot and does not enter the  
country or coverage area where the RU is located (i.e. -  
the OU does not know where the RU is located). While  
this process will be described in more detail below, a  
brief summary of the process in this situation follows.

20 The originating web site or server 9 accessed by the  
OU first looks up in its or the system's memory to see if  
the RU has input into the paging system his or her



expected whereabouts (i.e. if the RU has designated a country, or in what country the RU may be located). If the system has stored such information, then server 9 retrieves it and utilizes network 3 to access the web site or server 9 in the designated country or area where the RU may be located. The site or server accessed in this area then communicates with the appropriate tower and attempts to page the RU. When the RU's pager is accessed, the communication is completed with the paging message being transmitted to the RU's pager 21.

However, when the RU's pager 21 cannot be accessed in the designated area, the receiving server (RS) 9 in this designated area transmits rejection or non-connect data back to the originating server (OS) 9 via network 3. Thereafter, the originating server 9 retrieves the country or access area list previously input by the RU and attempts to page the RU in the countries or access areas found on the RU's list in the order in which they are set forth (e.g. see Figure 3). The system goes through each country or area on the RU's list and attempts pages of the RU either until the system reaches the RU's pager 21 or until the system has gone through

the RUs list of countries or coverage areas a predetermined number of times (e.g. two). Optionally, when a connection is made with the RU's pager 21, a confirmation E-mail message is sent back to the OU's web site if he/she has one.

Figure 2 is a block diagram/flow chart illustrating how a subscriber (RU) subscribes to the pager system and inputs particular location data according to certain embodiments of this invention. When the subscriber or RU first subscribes to the paging system of Figure 1, he or she is assigned a pager # (e.g. 212-xxx-yyyy) and a pin I.D. at 31. Following this assignment, the subscriber or RU inputs his or her "list" of countries to be serviced at 33. The RU will typically list all countries or coverage areas 5-9 at 33 that he or she wishes to be reachable in by way of the paging system. In other words, the RU may not be paged in a country or coverage area unless that country or area is listed in step 33 (or is added at a later point in time by the RU calling the system, entering his pin #, and amending his or her list).

Then, or at the same time, the RU at 35 lists the countries in the order he or she wishes that they be accessed in the event that no country or area has been designated. In other words, in step 35 the RU lists his or her accessible countries in the order in which he or she is most likely to be in them. For example, if the RU spends most of his time in the U.S. and Japan, the next most amount of time in France, some time in the U.K., Spain, Brazil, and Australia, and very little time in Mexico, the RU would likely, in step 35, list his/her countries in the following order:

1. United States
2. Japan
3. France
4. Spain
5. United Kingdom
6. Brazil
7. Australia
8. Mexico

Given such a list, the RU may only be paged in these eight countries. In the event that no country is currently "designated" by the RU, the system will attempt to page the RU first in the U.S. a predetermined number of times, then in Japan said predetermined number of times, then in France said predetermined number of times....and finally in Mexico said predetermined number

of times. The system will attempt pages in these countries and will repeat this process until either the RU's pager is accessed and acknowledges receipt of a page, or until the list has been gone through a  
5 predetermined number of times (e.g. two).

After the RU has been entered into the system, given a pager, and is able to be paged, he/she may periodically enter into the paging system a "designated country" (i.e. what country the RU is in or expects to be in) at 37.  
10 For example, when the user leaves the U.S. and travels to Australia on business, the RU may access a server 9 in the system via E-mail or DTMF telephone, input his/her pin#, and then input or designate Australia as a "designated country." When this is done, the paging  
15 system will first attempt to page the RU in Australia each time he/she is paged by an OU. If the RU cannot be reached in Australia (i.e. the designated country), the system resorts to the list input at 33 in the order input at 35 and attempts to page the RU.

20 As shown in step 39, designated country data input by the RU is automatically erased after a predetermined period of time (e.g. 30 days). When deletion occurs, the

system automatically pages the RU and informs the RU that his/her designated country data has been deleted from the system. At this point in time, the RU may E-mail or call up any web site or server 9 in the paging system and  
5 either renew his designated country or enter a new designated country or coverage area.

Figure 3 illustrates a computer or PC screen shown to the RU prompting the RU to list his/her countries in the order discussed above in steps 33 and 35. An  
10 exemplary list of countries input by an RU is also shown in Figure 3.

Figure 4 is a flow chart illustrating how a subscriber or RU may "designate" a country to first be paged in according to certain embodiments of this  
15 invention. Two different methods are shown in Figure 4, methods A and B. According to method A, the subscriber or RU first telephones (or E-mails) any web site or server 9 of the system in step 41. In step 43, the remotely calling subscriber may determine via DTMF input  
20 whether or not a country or coverage area is currently designated in his or her account. Then, in step 45, when no country is currently designated or the subscriber

wishes to designate a new country, the subscriber inputs a new country for designation to the server by way of either DTMF or voice input. Optionally, the server may require the remotely calling subscriber to input his or  
5 her pin I.D. number for confirmation and/or security purposes. After the designated country has been entered in step 45, the server 9 communicates the new country designation in step 47 to all other servers in the Figure 1 paging system via network 3, each of the sites 9  
10 storing the information in their memory in certain embodiments. As discussed above, country designations may automatically expire after a predetermined period of time (e.g. thirty days) unless renewed or programmed to be automatically renewed. See step 49.

15 Method B in Figure 4 illustrates another process for designating a country. Firstly, in step 51, the subscriber, using his PC, communicates with a server 9 in the paging system via either E-mail or a modem via the PSTN. Thereafter, in step 53 the subscriber determines  
20 if a country is currently designated in his account. In step 55, the subscriber either renews his designation, or enters a new country to be designated via E-mail or the

PSTN using his PC's keyboard. Then, in step 57, the server 9 which had been in communication with the remotely calling subscriber communicates via network 3 the new designated country for the user's account to all  
5 servers in the paging system which store same.

Figure 5 is a flow chart illustrating how a page is carried out according to certain embodiments of this invention. Firstly, in step 61, the OU either telephones or E-mails an originating server 9 in order to initiate a  
10 page to an RU. In step 63, the OU inputs the I.D. number of the RU's pager; and the paging message. After the RU's pager number has been identified, the originating server 9 in step 65 determines whether or not the RU currently has a designated country that he wishes to be  
15 first paged in. If not, the originating server 9 causes the RU to be paged in accordance with his previously entered list of countries in their recited order at 67. See Figure 3 for an exemplary list. Given the Figure 3 list, for example, the system will first page the RU in  
20 the U.S.A., then in Canada, then in the U.K., etc., until either the RU's pager indicates receipt of a page or

until this process has been carried out at a predetermined number of times.

In the event that, in step 65, the originating server 9 determines that a country has been "designated" in the RU's account, the paging data and message is transmitted over network 3 to a remote or terminator server 9 located in the designated country or coverage area at 69. Thereafter, in step 71, the terminator server 9 in the designated country or area causes the RU to be paged via a corresponding tower 13. If the page is acknowledged by the RU's pager in step 73, then the RU or subscriber is billed accordingly in step 75 and his or her country designation is extended for another five days according to one option. If, however, the terminator server 9 in the designated country in step 73 does not receive acknowledgment from the RU's pager, then the terminator server causes the terminating tower to repeat the page a number (Z) of times in the designated country. See step 77. Each time the paging process is repeated in the designated country, the predetermined number being lessened by one after each attempt ( $Z = Z-1$ ).



When it is determined in step 79 that Z finally equals 0, the system stops attempting to page the RU in the designated country, and retrieves the RU's list of service countries and performs pages therein a  
5 predetermined number of times as discussed above in step 81. In step 81, the paging systems continues to page the RU in his<sup>1</sup> listed countries until either receipt of the page is confirmed 83, or until the process has been performed a predetermined number of times. If the page  
10 is confirmed, the subscriber is billed accordingly in step 75. According to certain alternative embodiments, if a page is confirmed 83 during the step 81 process, then in step 75 the RU's designated country may be automatically changed so as to correspond to the country  
15 or coverage area in which the page was confirmed at 83. After step 75, the transaction is ended 85.

Figure 6 is a block diagram/flow chart illustrating how a particular subscriber or RU is billed according to certain embodiments of this invention. Typically,  
20 subscribers are billed on a monthly basis. In step 91, the subscriber or RU is billed a predetermined amount per month for each country listed on the RU's "list" (see

Figure 3). Additionally, each country on the RU's list may cost a different amount of money. For example, having the U.S. on one's list may be more expensive per month than Mexico or Brazil. In any event, the RU is billed monthly for his listed countries. In step 93, it is determined whether or not the RU's account had a "designated country" for each day of the applicable month. If a country was designated each day of the month, then in step 95 the RU is billed a predetermined amount per day for the designations. The billing in step 95 is over and above the monthly billing determined in step 91. When it is determined at 93 that, for example, no country was designated in the RU's account for ten days in the applicable month, then, in step 97, the RU is not additionally billed for those ten days. However, in step 97, the RU is additionally billed for the twenty or so days in the applicable month in which a country was designated. Thereafter, in step 99, the RU is billed for the amount of air time used and applicable network charges such as long distance and the like. In step 101, a monthly billing statement is sent to the RU either to his home address or to his web site over net via E-mail.

In accordance with certain cellular telephone embodiments of this invention, one cell phone user 23 may telephone a local web site or server 9 via a corresponding tower 13 and transmitter/receiver 11. Once  
5 communicating with the local web site or server 9, the cell phone caller may input the telephone number of a cellular telephone of a callee. Upon receiving the callee's telephone number, the local web site or server 9 looks up in its memory to see if the callee has a  
10 "designated" country or coverage area as discussed above. If so, the telephone signal is packetized and transmitted over network 3 to a receiver web site or server in the country or area designated by the callee for depacketizing and transmission via a tower 13 to the  
15 callee's cellular phone. In other words, this process is similar to that discussed above with the pagers, except that cellular phone information is transmitted as opposed to paging information. Meanwhile, if the server 9 determines that no country is designated, the system  
20 attempts to call the callee's phone in the countries on his or her "list" (see Figure 3) in the order in which the countries are listed as discussed above. When the

callee's cellular phone is finally reached, the caller and callee may carry on a telephone conversation with the voice data being transmitted back and forth between the two respective servers 9 and packet switched digital data network 3. This avoids the need for long distance calling according to certain embodiments of this invention. Billing is carried out for cell phone embodiments in accordance with Figure 6 as discussed above.

10        Once give the above disclosure, many other features, modifications, and improvements will become apparent to the skilled artisan. Such other features, modifications, and improvements are, therefore, considered to be a part of this invention, the scope of which is to be determined  
15        by the following claims.